IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of:	]
NORMANN SANDOY et al	]
Serial No: 10/566,574	]
	]Group Art Unit: 2834
Filed: February 16, 2006	]Examiner: I. Mohandesi
For: PROPULSION SYSTEM FOR SHIPS	]Attorney Docket: 06006

]

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

APPELLANTS' BRIEF ON APPEAL

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I. REAL PARTY IN INTEREST

The real party in interest is the assignee, Norpropeller AS, Kristiansund, Norway.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 6-14 stand rejected and are under appeal.

Claims 1-5 have been canceled.

IV. STATUS OF AMENDMENTS

There are no pending amendments.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention is directed to a propulsion system for ships and other mobile marine structures (page 1, lines 3-4), comprising:

a driving machine (page 4, lines 11-12; element 17 in Fig. 1);

a synchronous, permanent magnet electrical generator having an electrical output and a plurality of poles (page 4, lines 14-15; element 14 in Fig. 1), powered directly by the driving machine (page 4, lines 11-12; Fig. 1);

a synchronous, permanent magnet electrical propulsion motor having a plurality of poles (page 2, lines 28-30; page 4, lines 3 and 22-23; element 11 in Fig. 1), powered by the output of the electrical generator, with a fixed and direct electrical connection thereto (page 2, lines 28-30; page 4, lines 4-5; element 13 in Fig. 1); and

a propulsion device (operated by a mechanical connection to the electrical propulsion motor page 4, lines 3-4; propeller 12 in Fig. 1),

the electrical generator and the electrical propulsion motor having operating characteristics which are substantially the same (page 2, lines 28-29).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are:

1) whether claims 6, 9, 11, and 12 are anticipated under 35 USC 102(b) by US 6,188,139 to Thaxton;

2) whether claims 7, 8, 10, 13 and 14 are obvious under 35 USC 103(a) over US 6,188,139 to Thaxton in view of US 3,859,578 to Botvinnik.

VII. ARGUMENTS

According to the final Office action,

> Thaxton '139 discloses a marine power distribution arrangement Turbo machine (Fig.2) propulsion system for ships comprising: a driving machine (11) and a synchronous, inherently permanent magnet electrical generator (12 "Fig. 3 does not show any excitation input to the magnet"), an electrical output and a plurality of poles, powered directly by the driving machine; a synchronous, permanent magnet electrical propulsion motor (41) having a plurality of poles, powered by the output of the electrical generator (see Fig. 2), with a fixed and direct electrical connection thereto; and a propeller (Fig. 2) or similar propulsion device operated by a mechanical connection (40) to the electrical propulsion motor (41), the electrical generator and the electrical propulsion motor having operating characteristics which are substantially the same (they both synchronous type machine).

The final Office action further states that

> the citation of the ratio of poles between the generator and the propulsion motor suggest the use in Thaxton et al of a synchronous permanent magnet generator directly connected to a synchronous permanent magnet motor with the same characteristics.

The invention is directed to a propulsion system for ships and other mobile marine structures, comprising 1) a synchronous, permanent magnet electrical generator, and 2) a synchronous permanent magnet electrical propulsion motor powered by the output of the electrical generator in a fixed and direct electrical connection thereto. In accordance with the invention, the synchronous, permanent magnet electric

generator and the synchronous, permanent magnet electrical propulsion motor have operating characteristics which are substantially the same.

Thaxton et al discloses a propulsion system for mobile marine structures having a propulsion motor which may be an induction motor, a wound-field synchronous motor, or a permanent magnet motor (column 4, lines 36-38).

According to Thaxton et al, "a propulsion modular PWM multi-level, multi-circuit power converter" is connected to receive power from the generator and to provide variable voltage and frequency power, the power being provided to the AC propulsion motor. This is specifically recited in Claim 1 of Thaxton et al, and is disclosed throughout the specification.

The motor is powered by a generator 12 operated by a turbine 11 through a distribution system 13. Even though Thaxton et al does not identify the generator 12 as being a synchronous, permanent magnet generator, the Office action takes the position that electrical generator 12 is a synchronous, inherently permanent electrical generator because "Fig. 3 does not show any excitation input to the magnet." Applicants believe that the assumption made in the final Office action is clearly unwarranted and incorrect.

Thaxton et al discloses a propulsion system that utilizes high RPM prime movers (col. 2, lines 17-37) and high frequency generators (col. 2, lines 13-15; lines 37-40). The system provides substantial weight reduction benefits, but necessitates the use of multiple frequency converters as well as transformers with phase shifting configuration to reduce system harmonics, interposed between the generator 12 and the motor 41.

Specifically, Thaxton et al states at col. 3, lines 41-46:

> This weight saving is offset in part by the requirement for power conversion equipment used for ship service loads. *However, the added weight of a 240 Hz-to-60 Hz power conversion stage* for that purpose is minimized by the use of the higher distribution frequency and the corresponding reduction in transformer weight as shown in Table 1 below. (emphasis added)

More specifically, Thaxton et al describes propulsion motor power conversion equipment 30, a "variable voltage and frequency PWM modular unit" which is described at col. 4, lines 28-40; this is a frequency converter which must be interposed between the generator 12 and the propulsion motor 41, for operation of the system.

Indeed, the Abstract of Thaxton et al describes this converter as "a first power converter by which the power is converted to a variable frequency, variable voltage AC output for ship propulsion."

A transformer 20 is also interposed between the generator and the propulsion motor.

Hence, the connection between the generator and the propulsion motor of Thaxton et al is not "fixed and direct" as is presently claimed; the connection must include a frequency converter, which is excluded by the language of present claim 6.

Moreover, synchronous AC generators (as presently claimed) are most commonly built with wound rotors that incorporate an excitation machine. The voltage regulator circuitry may or may not be located in the generator housing. Since Thaxton et al does not disclose the AC generator to be the synchronous type at all, the frequency conversion equipment described in the patent is essential to the function of the system both for supplying the main

distribution bus and for driving the propulsion motor.

According to the invention, frequency conversion equipment is not necessary between the generator and the propulsion motor because the characteristics of both units are the same. No frequency converter need be provided to drive the propulsion motor, because the RPM of the propeller is regulated by the RPM of the prime mover, in the ratio determined by the number of poles in the machines.

Thus, the generator and the propulsion motor of the invention must not only both be synchronous, permanent magnet devices, but must have substantially the same characteristics, thereby avoiding the use of frequency conversion equipment.

The final Office action assumes that the generator is of a synchronous type, and then alleges that it has the same characteristics as the propulsion motor, which may be of the synchronous type, because they are both of the synchronous type. To the contrary: if the generator and the propulsion motor of Thaxton et al had the same characteristics, the frequency conversion equipment required by Thaxton et al would not be necessary. Because frequency conversion is necessary, it is confirmed that the generator and the propulsion motor do not have the same characteristics.

Claims 6 and 7 of Thaxton et al describe an arrangement for the reduction of harmonic disturbances created by the power electronics (in Figure 3 of Thaxton et al, transformers 67-74). According to the claimed invention, with the permanent magnet generator, no harmonic disturbances are created and the generator is not sensitive to such disturbances. As Thaxton et al does not appreciate this feature of permanent magnet generators, it appears that the disclosure of permanent magnet generators may well be theoretical.

The presently claimed direct link between the generator and the motor has inherently low harmonic disturbances, and the ship service system drain is small in relation to generator/motor capabilities.

The influence of harmonics generated by the relatively small frequency converter 16 for powering the ship's service system (and not interposed between the generator and propulsion motor) is of little consequence to the generator/motor. Thus, the necessity for harmonic dampening devices has largely been eliminated.

Thaxton et al does not include an auxiliary generator, so that the power from all generators disclosed is routed through the main distributing bus which operates at high frequency.

Botvinnik et al has been cited for the purpose of disclosing a ratio between the number of poles in the generator and the number of poles in the propulsion motor in the claimed range (present claim 7), having the generator with fewer poles than the propulsion motor (present claim 8), and the use of an auxiliary generator (present claim 10).

However, the citation of the ratio of poles between the generator and the propulsion motor does not suggest the use in Thaxton et al of a synchronous permanent magnet generator *directly connected* to a synchronous permanent magnet motor with the same characteristics; to the contrary, Thaxton et al requires a frequency converter. Moreover, the system of Botvinnik et al is completely different from that of the claimed invention, Botvinnik et al disclosing an asynchronous-synchronous machine 35 and a converting unit 38 forming an integral and essential part of system control circuitry for modulating an RPM operation. Appellants believe that it is incorrect to call such a device an "auxiliary generator."

To summarize, the claimed invention requires a synchronous, permanent magnet electrical generator directly connected to a synchronous, permanent magnet electrical propulsion motor having the same characteristics as the generator.

Thaxton et al discloses an electrical generator of unknown type connected to a propulsion motor which may be a synchronous motor, through a transformer and a modular PWM multi-level, multi-circuit power converter, used to obtain a variable frequency, variable voltage AC output for ship propulsion.

No fixed and direct connection exists between the generator and propulsion motor of Thaxton et al, such that even if the generator and propulsion motor were synchronous, permanent magnet devices of the same characteristics, which has not at all been established by the final Office action, Thaxton et al would still not anticipate the claimed invention.

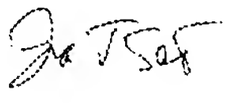
Botvinnik et al does nothing to cure the defects of Thaxton et al, as discussed in detail above.

Based upon the above-cited distinctions between Thaxton et al and the invention, it is clear that one of ordinary skill in the art could not derive the invention based either upon Thaxton et al taken alone, or in combination with Botvinnik et al.

Conclusion:

Based on the arguments presented above, reversal of the rejections of record is requested.

Respectfully submitted,



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VIII. CLAIMS APPENDIX

6. Propulsion system for ships and other mobile marine structures, comprising:

a driving machine;

a synchronous, permanent magnet electrical generator having an electrical output and a plurality of poles, powered directly by the driving machine;

a synchronous, permanent magnet electrical propulsion motor having a plurality of poles, powered by the output of the electrical generator, with a fixed and direct electrical connection thereto; and

a propulsion device operated by a mechanical connection to the electrical propulsion motor,

the electrical generator and the electrical propulsion motor having operating characteristics which are substantially the same.

7. Propulsion system according to claim 6, having a ratio between the number of poles in the generator and the number of poles in the propulsion motor of 3:1 to 1:20.

8. Propulsion system according to claim 7, wherein the generator has fewer poles than the propulsion motor.

9. Propulsion system according to claim 6, wherein the output of the electrical generator is additionally connected to a branch circuit for feeding a consumption network, a frequency converter being provided between the output and the branch circuit to provide a stable frequency from the generator.

10. Propulsion system according to claim 6, additionally comprising an auxiliary generator powered by the driving machine for feeding a consumption network, a frequency converter being provided between the auxiliary generator and the consumption network.

11. Propulsion system according to claim 6, wherein the

driving machine is a speed-adjustable combustion engine.

12. Propulsion system according to claim 11, wherein the engine is a diesel engine or gas turbine engine.

13. Propulsion system according to claim 6, wherein the generator has six poles, yielding 50 Hz at 1000 rpm.

14. Propulsion system according to claim 13, wherein the propulsion motor has 24 poles.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.